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IMPROVE WELDING, CASTING METHODS AT USSR MACHINE BUILDING PLANTS

NEW AUTOMATIC WELDING PROCESS -- Leningradskaya Pravda, 25 Aug 53

In 1952, the Leningrad branch of the Orgtyazhmash Institute [State Union Institute for the Introduction of High-Production Technology and Production Organization in the Heavy Machine Building Industry] was given the task of prescribing manufacturing technology and equipment for one of the basic shops of the Barnaul Boiler Plant.

Choice of a welding process for the seams of thick-walled boilers was one of the most difficult decisions. Multilayer automatic welding was rejected as requiring excessively expensive welding equipment and highly skilled workers.

While the problem was under study, the Leningrad House of Scientific and Technical Propaganda sent to the [Orgtyazhmash] Institute a pamphlet describing a new welding method applied by workers of the Institute of Electric Welding imeni Paton, Academy of Sciences Ukrainian SSR. Used in welding the casings of blast furnaces, the method is called single-pass electroslag welding; it replaced multilayer automatic welding, which requires a series of passes. After consulting the academy, the institute decided to try this process. The Taganrog Krasnyy Kotel'shchik Plant was chosen for production tests. After hundreds of attempts, the efforts resulted in success. A cylinder 3.5 meters high, with a diameter of 1.6 meters and a wall thickness of 90 millimeters, was completed in 3.5 hours, as compared with 21 hours required by the former method. The quality of the weld was excellent.

The process is carried out as follows: If two metal sheets 10-12 millimeters thick, for example, are to be welded, they are placed vertically with a gap of 20-25 millimeters between them. At the gap is placed a welding apparatus. Two water-cooled sliding strips of red copper close the gap from opposite sides [faces of the sheets], forming a closed area into which the electrode is fed. Melting and filling in this closed area, the electrode at the same time fuses

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the edges of the sheets and firmly unites them. The copper strips cool the fused metal. Moving upward along a guide column at a rate of 1-3 meters per hour, the apparatus welds the butts of the sheets in a single pass. In the same manner, parts can be welded on an incline. Formerly automatic welding could be done only horizontally.

In plants where the new process has been used on boilers, labor productivity has been increased by 3-10 times, depending on the thickness of the welded material. It is noteworthy that the greater this thickness, the more effective the weld and the better its quality. The new process has reduced the consumption of expensive flux to one tenth the former amount, while expenditure of electrodes has been cut by one third and consumption of electric power by one quarter.

The process has considerably simplified welding technology. Preheating is no longer necessary. Only one heat treatment is required, and the second welding after the first heat treatment is eliminated. Thus the steps involved in the ordinary welding cycle are cut almost in half, the labor is lightened, and both equipment and working area are freed.

The Barnaul Boiler Plant is soon to be given detailed information on the technology of the new process. This method can be used not only on boilers; but also on steam and hydroturbines, in general machine building, and even in bridge construction.

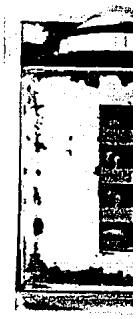
IMPROVED PRECISION CASTING PROCESS -- Moscow, Trud, 3 Jul 53

In recent times, the practice of precision casting has gained rather extensive application at machine building plants. Molds for such castings are prepared in the following manner. A paraffin wax pattern is dipped into a solution on ethyl silicate and "marshalit" in ethyl alcohol. After drying for 3-4 hours, this solution forms a hard heat-resistant crust on the surface of the pattern. The dipping process is repeated five times to give this crust the required thickness. Pattern and crust are then placed into a flask and packed with sand. When the flask is heated in an oven, the pattern melts away, with 30 percent of the paraffin absorbed by the crust and the rest recovered. When this process is used, preparation of a small mold takes 40-50 hours.

Two engineers of the Sverdlovsk Uralmash Plant have improved the process by replacing the expensive solution with one of ordinary water glass and "marshalit" in water. As before, the paraffin pattern is dipped into the solution, but instead of being dried it is dipped directly into another solution, and the heat-resistant crust hardens immediately. The pattern must still be dipped five times, but at intervals of only 20-30 seconds. Thus, the entire process of forming the crust requires only 8-10 minutes. Since this crust, unlike the other, is water-repellent, it can be placed directly into hot water to melt the paraffin, which is then recovered with a loss of only 4-5 percent, instead of the former 30 percent loss.

The innovators have also improved the method of making the paraffin patterns, reducing the duration of that operation by several times.

The new process requires only half the former working area, cuts power consumption in half, lightens the labor involved, and produces a better casting. At the Uralmash Plant, use of this process in producing cast tools should effect a yearly savings of 700,000 rubles. At present, it is being successfully applied to ordinary castings for machine parts, and the precision attained almost completely eliminates the necessity for machining.



Widespread use of the process should make possible a saving of hundreds of millions of rubles yearly. Nevertheless, the former Ministry of Heavy Machine Building showed little interest in the process. The Ministry of Transport and Heavy Machine Building should see to it that progressive technology which has already proved itself receives wider application.

INCREASE FOUNDRY PRODUCTIVITY -- Tashkent, Pravda Vostoka, 4 Jun 53

In 1952, the foundry of the Tashkent Excavator Plant increased its output of steel castings by 55 percent over the 1951 total, with no change in the melting facilities. Production in March of 1953 was 2.28 times that of March 1952.

There were two major reasons for the increase. The first was a decision to overload the furnaces, which was carried out satisfactorily, and the second was plant research which made it possible to improve the quality of the brick furnace linings. Though linings should normally last from 120-150 meltings without repair, as late as the first quarter of 1952 such repair was necessary after 15-40 meltings. This has been corrected, and in the May Day competitions of 1953, one furnace was used for 337 meltings before repairs.

In the first 3 months of 1953, 24 tons of fire brick and 41,000 kilowatt-hours of electricity were saved.

USE HIGH-STRENGTH CAST IRON IN PUMPS -- Moscow, Vechernyaya Moskva, 20 Aug 53

The Moscow Pump Plant imeni Kalinin has mastered the technique of turning out high-strength cast iron. Use of this material in casting thin-walled bodies and other large parts for all powerful pumps reduces the weight of the products by an estimated 20 percent. Other organizational and technological measures have helped the plant to save over 200 tons of metal since the beginning of 1953. Production costs have been lowered by 15.9 percent instead of the 13.2 percent envisaged in the plan.

ELECTRONIC CONTROL OF HEAT TREATMENT -- Baku, Bakinskiy Rabochiy, 21 Apr 53

The Baku Machine Building Plant imeni Dzerzhinskiy is daily producing several dozens of deep-well pumps above plan. This is partly a result of using electronic signaling and temperature control devices in the heat-treating process.

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